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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 19

Application Number: 09/390,554
Filing Date: September 03, 1999
Appellant(s): PAU ET AL.

Paul J Ditmyer
<u>For Appellant</u>

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06/19/2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The Appellant states that all claims stand and fall together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

Zhao, Yao. "A hybrid image compresion scheme combining block-based fractal coding and DCT" Institute of Information Science ELSEVIER Signal processing comunication March 8 1996 No 2

5689592	Ericson et al	11-1997

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao in view of Ericsson et al.

Claim 5, 8, 9,12 and 13: A method of calculating the discrete cosine transform (DCT) of blocks of pixels of an image, comprising the steps of:

defining first subdivision blocks as range blocks, having a fractional and scalable size $N/2^i*N/2^i$, where i is an integer; defining second subdivision blocks of N*N pixels as domain blocks, shift-able by intervals of N/2' pixels; and calculating, in parallel, the DCT of 2^i range blocks of a domain block of N*N pixels of the image. (See Zhao page 74 column 2 disclosed by the applicant as pertinent art, wherein he subdivides the blocks into range and domain blocks. Furthermore he shifts the domain blocks vertically and horizontally as is claimed. While he does not teach the calculation in parallel, Ericsson does. In column 3 lines 6-20 Ericsson clearly teaches the benefits of processing images in parallel rather than in sequence. Therefore it would have been obvious to one of ordinary skill in the art, to implement parallel processing techniques in order to reduce processing times.)

Claim 8 is further limited to classifying the transformed range blocks according to their relative complexity represented by a sum of values of three AC coefficients; applying a fractal transform in the DCT domain to data of the range blocks whose complexity classification exceeds a pre-defined threshold and only storing a DC coefficient of the range blocks with a complexity lower than the threshold, while identifying a relative domain block to which the range block in a transformation belongs that produces a best fractal approximation of the range block; (See pages 74-75 of Zhao clearly teaching this.)

calculating a difference between each range block and its fractal approximation; quantizing the difference in the DCT domain by using a quantization table preestablished in consideration of human sight characteristics; coding the quantized difference by a process based on probabilities of quantization coefficients; and storing or transmitting code of each range block compressed in the DCT domain and the DC coefficient of each uncompressed range block. (See Zhao page 76 column 2.)

Claim 6, 10 and 14: A method according to Claim 5, wherein the step of calculating comprises the steps of:

a) ordering the pixels in the range blocks of a certain dimension by rearranging input pixels in 2' vectors of 2' components; (See column 2 page 74 of Zhao)

b) calculating, in parallel, 2' monodimensional DCT.s by processing the vectors defined in the step a);

c) arranging output sequences of the monodimensional DCTs relative to the 2^i vectors;

d) completing the calculation in parallel of 2' bidimensional DCTs by processing output sequences of monodimensional DCTS produced in step c); and

e) arranging output sequences of bidimensional DCTs generated in step d) in 2' vectors of bidimensional DCT coefficients. (See Zhao pages 75-76 where he clearly teaches each of these steps. The applicant has change the phraseology but the algorithms as shown in Zhao clearly teach the steps as claimed.)

Claim 7, 11. A method according to Claim 6, wherein the step of calculating 2'monodimensional DCTs in parallel in step b) and the step of completing the parallel calculation of 2^i bidimensional DCTs of step d) are performed by subdividing the sequences resulting from step a) and from step c), respectively, in groups of scalar elements, calculating the sums and differences thereof by way of adders and subtractors and by reiterately multiplying the sum and difference results by respective coefficients until completing the calculation of the relative DCT coefficients, respectively monodimensional and bidimensional. (See Zhao pages 75-76 showing formulas that require adders, subtractors and multipiers to carry out the operations.)

(11) Response to Argument

1. The Appellant argues that the patentable distinction between the current invention and that of the prior art of record is that he defines a first subdivision blocks as range blocks, <u>having a fractional and scalable size $N/2^i*N/2^i$</u>, where i is an integer; defining second subdivision blocks of N*N pixels as domain blocks. However, Zhaos domain blocks are 16X16 and his range blocks are 8X8. 8 = <u>$16/2^1$</u> See Zhao page 2 column 2 first paragraph. While Zhao is not explicit about his scalability he does make reference to the fact that image quality is inversely related to the size of the macro block being encoded. See Zhao first page second paragraph. Therefore, one of ordinary skill in the art can infer scalability. The scalability

would then require a mathematical formula to determine the size of the range blocks as a function of the domain blocks. For example if the domain were to be 8X8 blocks then it would follow that the rage blocks would have to be 4X4 blocks or 2X2 blocks or N/2 to the i power, i being 1 for a first order reduction and 2 for a second order reduction. However, mathematical formulas are not patentable. See the following case law In Re Gottschalk v. Benson, 175 USPQ 673 (S. Ct. 1972, In re Richman, 195 USPQ 340 (CCPA 1977) In re Christensen, 178 USPQ 35 (CCPA 1973 and In re Chatfield, 191 USPQ 730 (CCPA 1976). In the present case as claimed, the Appellant is simply deriving a formula from the size of the range and domain blocks. In fact if Zhao were to use 8X8 domain blocks his range blocks would have to scale to 4X4 blocks, so that when the range blocks slide across the image, every 4 pixels the range block will not overshoot the domain block as would be the case if say a 6X6 range block were used and slid across every 6 pixels. Therefore each range block will scale in proportion to the size of the domain block by $N/2^i$. Thus an 8X8 domain would be partitioned into 4X4 blocks as a matter of mathematical fact. Therefore at the time the invention was made, it would have been obvious to one of ordinary skill in the art, to use Zhaos paper glean from it that a DCT transform can be done on different size blocks i.e. the smaller the block the higher the image quality, and simply make the transformation scalable by writing a formula. In addition note that in the Appellants specification "i" is never used as any number other than 1, so he really is only scaling it by N/2.

As for the appellants assertion that Ericsson does not teach parallel processing of DCT's thus the references cannot be combined, this is a mischaracterization on the part of the Appellant and a piecemeal analysis of the combined reference. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Never the less, a careful reading of Ericsson column 8 lines 30-38 inter-alia clearly shows that Ericsson's invention can be used for parallel DCT processing. Thus considering the clear teaching from Ericsson in columns 2 and 3 that motion picture processing is computationally intensive and that a parallel processor is well suited for such a task, it would have been obvious to one of ordinary skill in the art to

makes use Zhao's paper as a blueprint combined with Ericssons parallel processing to make the invention as claimed.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

CEP
August 27, 2003

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